

1652

Attorney Docket No.: 13761-726

SEQUENCE LISTING



#9

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<110> University of Southern California
Stallcup, Michael R.
Chen, Dagang
Hong, Heng
Asward, Dana W.

<120> REGULATION OF GENE EXPRESSION BY PROTEIN
METHYLATION

<130> 13761-726

<140> US 09/464,377

<141> 1999-12-15

<150> US 60/112,523

<151> 1998-12-15

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<170> FastSEQ for Windows Version 4.0

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<210> 2

<211> 608

<212> PRT

<213> Artificial Sequence

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<223> Deduced amino acid sequence of CARM1

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Thr Pro Ser Pro Pro Pro Gly Ser His Tyr Thr Ser Pro Ser Glu Asn				
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Ala Gly Met Pro Thr Ala Tyr Asp Leu Ser Ser Val Ile Ala Gly Gly				
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Ser Ser Val Gly His Asn Asn Leu Ile Pro Leu Ala Asn Thr Gly Ile				
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<211> 608

<212> PRT

<213> Artificial Sequence

<220>

<223> CARM1 VLD TO AAA Variant

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	35
Gln Arg His Ala Glu Gln Gln Ala Leu Arg Leu Glu Val Arg Ala Gly	
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Pro Asp Ala Ala Gly Ile Ala Leu Tyr Ser His Glu Asp Val Cys Val	
65	70
Phe Lys Cys Ser Val Ser Arg Glu Thr Glu Cys Ser Arg Val Gly Arg	
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	130
Ser Ser Ala Val Gln Tyr Phe Gln Phe Tyr Gly Tyr Leu Ser Gln Gln	
145	150
Gln Asn Met Met Gln Asp Tyr Val Arg Thr Gly Thr Tyr Gln Arg Ala	
	155
	160

Ile	Leu	Gln	Asn	His	Thr	Asp	Phe	Lys	Asp	Lys	Ile	Ala	Ala	Ala	Val
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Gly	Cys	Gly	Ser	Gly	Ile	Leu	Ser	Phe	Phe	Ala	Ala	Gln	Ala	Gly	Ala
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Arg	Lys	Ile	Tyr	Ala	Val	Glu	Ala	Ser	Thr	Met	Ala	Gln	His	Ala	Glu
	210					215				220					
Val	Leu	Val	Lys	Ser	Asn	Asn	Leu	Thr	Asp	Arg	Ile	Val	Val	Ile	Pro
225					230					235					240
Gly	Lys	Val	Glu	Glu	Val	Ser	Leu	Pro	Glu	Gln	Val	Asp	Ile	Ile	Ile
			245						250					255	
Ser	Glu	Pro	Met	Gly	Tyr	Met	Leu	Phe	Asn	Glu	Arg	Met	Leu	Glu	Ser
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Tyr	Leu	His	Ala	Lys	Lys	Tyr	Leu	Lys	Pro	Ser	Gly	Asn	Met	Phe	Pro
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Thr	Ile	Gly	Asp	Val	His	Leu	Ala	Pro	Phe	Thr	Asp	Glu	Gln	Leu	Tyr
	290					295					300				
Met	Glu	Gln	Phe	Thr	Lys	Ala	Asn	Phe	Arg	Tyr	Gln	Pro	Ser	Phe	His
305					310					315					320
Gly	Val	Asp	Leu	Ser	Ala	Leu	Arg	Gly	Ala	Ala	Val	Asp	Glu	Tyr	Phe
			325						330					335	
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			340					345					350		
Ser	Val	Lys	Tyr	Thr	Val	Asn	Phe	Leu	Glu	Ala	Lys	Glu	Gly	Asp	Leu
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His	Arg	Ile	Glu	Ile	Pro	Phe	Lys	Phe	His	Met	Leu	His	Ser	Gly	Leu
	370					375					380				
Val	His	Gly	Leu	Ala	Phe	Trp	Phe	Asp	Val	Ala	Phe	Ile	Gly	Ser	Ile
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Tyr	Gln	Val	Arg	Cys	Leu	Phe	Gln	Ser	Pro	Leu	Phe	Ala	Lys	Ala	Gly
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 <223> Peptide used for in vitro methylation experiments

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Phe	Thr	Ile	Asp	Leu	Asp	Phe	Lys	Gly	Gln	Leu	Cys	Glu	Leu	Ser	Cys	
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<223> Human PRMT2

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Pro	Arg	Ala	Val	Tyr	Ala	Val	Glu	Ala	Ser	Glu	Met	Ala	Gln	His	Thr
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Gly	Gln	Leu	Val	Leu	Gln	Asn	Gly	Phe	Ala	Asp	Ile	Ile	Thr	Val	Tyr
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Gln	Gln	Lys	Val	Glu	Asp	Val	Val	Leu	Pro	Glu	Lys	Val	Asp	Val	Leu
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Val	Ser	Glu	Trp	Met	Gly	Thr	Cys	Leu	Leu	Phe	Glu	Phe	Met	Ile	Glu
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Ser	Ile	Leu	Tyr	Ala	Arg	Asp	Ala	Trp	Leu	Lys	Glu	Asp	Gly	Val	Ile
225					230					235					240
Trp	Pro	Thr	Met	Ala	Ala	Leu	His	Leu	Val	Pro	Cys	Ser	Ala	Asp	Lys
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Leu	Ser	Ala	Leu	Lys	Ser	Leu	Ala	Val	Lys	Glu	Phe	Phe	Ser	Lys	Pro
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Lys	Tyr	Asn	His	Ile	Leu	Lys	Pro	Glu	Asp	Cys	Leu	Ser	Glu	Pro	Cys
	290					295					300				
Thr	Ile	Leu	Gln	Leu	Asp	Met	Arg	Thr	Val	Gln	Ile	Ser	Asp	Leu	Glu
305					310					315					320
Thr	Leu	Arg	Gly	Glu	Leu	Arg	Phe	Asp	Ile	Arg	Lys	Ala	Gly	Thr	Leu
				325					330					335	
His	Gly	Phe	Thr	Ala	Trp	Phe	Ser	Val	His	Phe	Gln	Ser	Leu	Gln	Glu
			340					345					350		
Gly	Gln	Pro	Pro	Gln	Val	Leu	Ser	Thr	Gly	Pro	Phe	His	Pro	Thr	Thr

		355					360				365						
His	Trp	Lys	Gln	Thr	Leu	Phe	Met	Met	Asp	Asp	Pro	Val	Pro	Val	His		
	370					375					380						
Thr	Gly	Asp	Val	Val	Thr	Gly	Ser	Val	Val	Leu	Gln	Arg	Asn	Pro	Val		
385					390					395					400		
Trp	Arg	Arg	His	Met	Ser	Val	Ala	Leu	Ser	Trp	Ala	Val	Thr	Ser	Arg		
				405					410					415			
Gln	Asp	Pro	Thr	Ser	Gln	Lys	Val	Gly	Glu	Lys	Val	Phe	Pro	Ile	Trp		
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 <212> PRT
 <213> Artificial Sequence

<220>
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			20					25					30				
Phe	Cys	Asn	Arg	Leu	Phe	Thr	Ser	Ala	Glu	Glu	Thr	Phe	Ser	His	Cys		
		35					40					45					
Lys	Ser	Glu	His	Gln	Phe	Asn	Ile	Asp	Ser	Met	Val	His	Lys	His	Gly		
	50					55					60						
Leu	Glu	Phe	Tyr	Gly	Tyr	Ile	Lys	Leu	Ile	Asn	Phe	Ile	Arg	Leu	Lys		
65				70						75				80			
Asn	Pro	Thr	Val	Glu	Tyr	Met	Asn	Ser	Ile	Tyr	Asn	Pro	Val	Pro	Trp		
			85						90					95			
Glu	Lys	Glu	Glu	Tyr	Leu	Lys	Pro	Val	Leu	Glu	Asp	Asp	Leu	Leu	Leu		
			100					105					110				
Gln	Phe	Asp	Val	Glu	Asp	Leu	Tyr	Glu	Pro	Val	Ser	Val	Pro	Phe	Ser		
		115					120					125					
Tyr	Pro	Asn	Gly	Leu	Ser	Glu	Asn	Thr	Ser	Val	Val	Glu	Lys	Leu	Lys		
	130					135					140						
His	Met	Glu	Ala	Arg	Ala	Leu	Ser	Ala	Glu	Ala	Ala	Leu	Ala	Arg	Ala		
145					150					155					160		
Arg	Glu	Asp	Leu	Gln	Lys	Met	Lys	Gln	Phe	Ala	Gln	Asp	Phe	Val	Met		
			165						170					175			
His	Thr	Asp	Val	Arg	Thr	Cys	Ser	Ser	Ser	Thr	Ser	Val	Ile	Ala	Asp		
			180					185					190				
Leu	Gln	Glu	Asp	Glu	Asp	Gly	Val	Tyr	Phe	Ser	Ser	Tyr	Gly	His	Tyr		
		195					200					205					
Gly	Ile	His	Glu	Glu	Met	Leu	Lys	Asp	Lys	Ile	Arg	Thr	Glu	Ser	Tyr		
	210					215					220						
Arg	Asp	Phe	Ile	Tyr	Gln	Asn	Pro	His	Ile	Phe	Lys	Asp	Lys	Val	Val		

225					230					235					240
Leu	Asp	Val	Gly	Cys	Gly	Thr	Gly	Ile	Leu	Ser	Met	Phe	Ala	Ala	Lys
				245					250					255	
Ala	Gly	Ala	Lys	Lys	Val	Leu	Gly	Val	Asp	Gln	Ser	Glu	Ile	Leu	Tyr
			260					265					270		
Gln	Ala	Met	Asp	Ile	Ile	Arg	Leu	Asn	Lys	Leu	Glu	Asp	Thr	Ile	Thr
		275					280					285			
Leu	Ile	Lys	Gly	Lys	Ile	Glu	Glu	Val	His	Leu	Pro	Val	Glu	Lys	Val
	290					295					300				
Asp	Val	Ile	Ile	Ser	Glu	Trp	Met	Gly	Tyr	Phe	Leu	Leu	Phe	Glu	Ser
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Met	Leu	Asp	Ser	Val	Leu	Tyr	Ala	Lys	Asn	Lys	Tyr	Leu	Ala	Lys	Gly
				325					330					335	
Gly	Ser	Val	Tyr	Pro	Asp	Ile	Cys	Thr	Ile	Ser	Leu	Val	Ala	Val	Ser
			340					345					350		
Asp	Val	Asn	Lys	His	Ala	Asp	Arg	Ile	Ala	Phe	Trp	Asp	Asp	Val	Tyr
		355					360					365			
Gly	Phe	Lys	Met	Ser	Cys	Met	Lys	Lys	Ala	Val	Ile	Pro	Glu	Ala	Val
	370					375					380				
Val	Glu	Val	Leu	Asp	Pro	Lys	Thr	Leu	Ile	Ser	Glu	Pro	Cys	Gly	Ile
385					390					395					400
Lys	His	Ile	Asp	Cys	His	Thr	Thr	Ser	Ile	Ser	Asp	Leu	Glu	Phe	Ser
				405					410					415	
Ser	Asp	Phe	Thr	Leu	Lys	Ile	Thr	Arg	Thr	Ser	Met	Cys	Thr	Ala	Ile
			420					425					430		
Ala	Gly	Tyr	Phe	Asp	Ile	Tyr	Phe	Glu	Lys	Asn	Cys	His	Asn	Arg	Val
		435					440					445			
Val	Phe	Ser	Thr	Gly	Pro	Gln	Ser	Thr	Lys	Thr	His	Trp	Lys	Gln	Thr
	450					455					460				
Val	Phe	Leu	Leu	Glu	Lys	Pro	Phe	Ser	Val	Lys	Ala	Gly	Glu	Ala	Leu
465					470					475					480
Lys	Gly	Lys	Val	Thr	Val	His	Lys	Asn	Lys	Lys	Asp	Pro	Arg	Ser	Leu
				485					490					495	
Thr	Val	Thr	Leu	Thr	Leu	Asn	Asn	Ser	Thr	Gln	Thr	Tyr	Gly	Leu	Gln
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<212> PRT

<213> Artificial Sequence

<220>

<223> Yeast ODP1 Protein Arginine Methyltransferase

<400> 10

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His	Glu	Glu	Met	Leu	Gln	Asp	Thr	Val	Arg	Thr	Leu	Ser	Tyr	Arg	Asn

	35		40		45												
Ala	Ile	Ile	Gln	Asn	Lys	Asp	Leu	Phe	Lys	Asp	Lys	Ile	Val	Leu	Asp		
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Val	Gly	Cys	Gly	Thr	Gly	Ile	Leu	Ser	Met	Phe	Ala	Ala	Lys	His	Gly		
65					70					75					80		
Ala	Lys	His	Val	Ile	Gly	Val	Asp	Met	Ser	Ser	Ile	Ile	Glu	Met	Ala		
				85					90					95			
Lys	Glu	Leu	Val	Glu	Leu	Asn	Gly	Phe	Ser	Asp	Lys	Ile	Thr	Leu	Leu		
			100					105					110				
Arg	Gly	Lys	Leu	Glu	Asp	Val	His	Leu	Pro	Phe	Pro	Lys	Val	Asp	Ile		
		115					120					125					
Ile	Ile	Ser	Glu	Trp	Met	Gly	Tyr	Phe	Leu	Leu	Tyr	Glu	Ser	Met	Met		
130						135					140						
Asp	Thr	Val	Leu	Tyr	Ala	Arg	Asp	His	Tyr	Leu	Val	Glu	Gly	Gly	Leu		
145					150					155					160		
Ile	Phe	Pro	Asp	Lys	Cys	Ser	Ile	His	Leu	Ala	Gly	Leu	Glu	Asp	Ser		
				165					170					175			
Gln	Tyr	Lys	Asp	Glu	Lys	Leu	Asn	Tyr	Trp	Gln	Asp	Val	Tyr	Gly	Phe		
			180					185					190				
Asp	Tyr	Ser	Pro	Phe	Val	Pro	Leu	Val	Leu	His	Glu	Pro	Ile	Val	Asp		
		195					200					205					
Thr	Val	Glu	Arg	Asn	Asn	Val	Asn	Thr	Thr	Ser	Asp	Lys	Leu	Ile	Glu		
210						215						220					
Phe	Asp	Leu	Asn	Thr	Val	Lys	Ile	Ser	Asp	Leu	Ala	Phe	Lys	Ser	Asn		
225					230					235					240		
Phe	Lys	Leu	Thr	Ala	Lys	Arg	Gln	Asp	Met	Ile	Asn	Gly	Ile	Val	Thr		
				245					250					255			
Trp	Phe	Asp	Ile	Val	Phe	Pro	Ala	Pro	Lys	Gly	Lys	Arg	Pro	Val	Glu		
			260					265					270				
Phe	Ser	Thr	Gly	Pro	His	Ala	Pro	Tyr	Thr	His	Trp	Lys	Gln	Thr	Ile		
		275					280					285					
Phe	Tyr	Phe	Pro	Asp	Asp	Leu	Asp	Ala	Glu	Thr	Gly	Asp	Thr	Ile	Glu		
290						295					300						
Gly	Glu	Leu	Val	Cys	Ser	Pro	Asn	Glu	Lys	Asn	Asn	Arg	Asp	Leu	Asn		
305					310					315					320		
Ile	Lys	Ile	Ser	Tyr	Lys	Phe	Glu	Ser	Asn	Gly	Ile	Asp	Gly	Asn	Ser		
				325					330					335			
Arg	Ser	Arg	Lys	Asn	Glu	Gly	Ser	Tyr	Leu	Met	His						
			340					345									